



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,597	01/20/2004	Stephen Memory	00655P1239US	1102
32116	7590	06/15/2005	EXAMINER	
WOOD, PHILLIPS, KATZ, CLARK & MORTIMER 500 W. MADISON STREET SUITE 3800 CHICAGO, IL 60661			COMPTON, ERIC B	
			ART UNIT	PAPER NUMBER
			3726	

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SP

Office Action Summary

Application No.

10/760,597

Applicant(s)

MEMORY ET AL.

Examiner

Eric B. Compton

Art Unit

3726

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2005.
 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1-12 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.
 4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
 5) ☐ Notice of Informal Patent Application (PTO-152)
 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3, 5, and 12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over DE 852249 to Schild.

Regarding claims 1, and 12, Schild discloses a method of fabricating a heat exchanger comprising:

a) providing a plurality of generally parallel tube runs (1) of a flattened heat exchange tube having a major dimension and a minor dimension;

b) providing a plurality of plate fins (2), each having a plurality of tube slots approximately equal to the number of tube runs, each slot opening to an edge of the associated fin and having

i) a shape corresponding to the cross-sectioned shape a tube run to be received in the slot,

ii) a depth less than the major dimension of the tube run to be received in the slot, and

iii) a width approximately equal to or slightly less than the minor dimension of the tube run to be received in the slot;

Art Unit: 3726

- c) fitting the tube runs snugly into corresponding slots in each of the fins such that an edge of each tube run extends a distance out of the slots in which it is received;
- d) locating the assembly resulting from step c) on a supporting surface with said tube run edges in contact with said supporting surface and with said plate fins extending above said tube runs; and
- e) subjecting said assembly to an elevated temperature sufficient to braze said fin to said tube runs while said assembly is on said supporting surface and in the absence of brazing fixtures holding said fins and said tube runs in assembled relation.

DE 852249 to Schild discloses a similar invention as disclosed by Applicant. The reference clearly states that the "lamellas do not extend beyond the outside extent of the pipes." See Altavista Machine Translation, fourth paragraph. In discussing the drawbacks of the then prior art, Schild discloses problems with heat exchangers in which the "ribs or sheet metal lamellas exceed the very far over the tubing extent." See Altavista Machine Translation, third paragraph. U.S. Pat. 1,913,175, cited by the DE 892249, is believed to be of the then prior art construction. As shown in Figure 1A of that reference the tubing does not extend past the slot of the plate fins. Furthermore, in U.S. '175 when the tubing and plate fins are inserted into the assembly fixture, the edges of the plates, rather than the tubing contact the support surface of the fixture. See *e.g.*, Figure 14.

Schild disclose that his invention alleviates the problem with the then prior art construction, which the plate fins are "extremely thin and sensitive [to] mechanical damages." See Altavista Machine Translation, fourth paragraph. Clearly, at the time of

Art Unit: 3726

invention of Schild it was recognizes that the fins could be damaged by mechanical damages, by extending past the edge of tubing. The reference discloses "Pipes in lamellas also at two in relation to lying edges according to the mall pipe axle open *Recesses so pushed in and soldered are that the outside lamella edges do not tower above the outside round ranges of the flatoval crosswise cut.*" See Altavista Machine Translation, first paragraph (emphasis added). These teaching taken in context clearly teach and/or suggest locating the assemblage of plate fins and tube runs on a supporting surface with the tube runs edges contacting the supporting surface, and the fins above and out of contact with the supporting surface.

Regarding claims 1 and 12, if not anticipated by Schild, it would have been obvious to one having ordinary skill in that art that the time the invention was made to have performed steps d and e, as claimed, in light of the teachings of Schild, in order to prevent damage to the thin plate fins during assembly.

Regarding claim 3, as shown in the figures the tube runs are each defined by a straight piece of tubing.

Regarding claim 5, the shape of the tubing may be oval shaped. See Fig. 1.

Regarding claim 12, it is inherently that the fins may settle under gravitational forces onto the tube runs and the brazing alloy dries.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 3726

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4, 7-8, and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schild in view of JP 10-089870 to NIPPON LIGHT METAL ("NIPPON").

Schild discloses the invention cited above, but not the particular claimed.

NIPPON discloses a heat exchanger nearly identical to Schild.

Regarding claim 4, NIPPON discloses, the shape of the tubing may be teardrop shaped. See Fig. 3. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the heat exchanger of Schild using teardrop shaped tube, in light of the teachings of NIPPON, in order to better engage plate fins with the taper design. See JPO Machine Translation [0022].

Regarding claims 7-8, Schild is silent with respect to the materials of the tubing and fins. NIPPON discloses the tubing and fins are made of an aluminum braze alloy. See JPO Machine Translation [0009]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the heat exchanger of Schild using tubing and fins made of aluminum braze alloy, in light of the teachings of NIPPON, in order to make a light weight heat exchanger.

Regarding claim 10, as shown in Fig. 1 of Schild, the flattened tubing has a major and minor dimension corresponding to the depth of the slot. The depth of the slot is less than the major dimension of the tubing, such that the extension section (3a) of the tubing slightly extends a short distance out of the slot. See Figure 1; see *also* Altavista

Art Unit: 3726

Machine Translation, fourth paragraph ("the lamellas do not extend beyond the outside extent of the pipes.").

Regarding claim 9, Schild discloses coating the assembly in a tin bath, but is silent as to coating the tube runs with an aluminum braze. NIPPON discloses the tube runs may be clad with an aluminum braze alloy See JPO Machine Translation [0028]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the heat exchanger of Schild by cladding the tubing and fins with an aluminum braze alloy, in light of the teachings of NIPPON, in order to allow braze the assemble in a brazing oven once formed.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schild view JP 05-099581 to Tanaka et al ("Tanaka").

Schild discloses the invention cited above. However, the reference does not disclose the tube runs are defined by straight sections of a serpentine tube.

Tanaka discloses a method for forming a heat exchanger similar in construction to NIPPON. As shown in Fig. 8, the tube runs may be defined by straight sections of a serpentine tube. Similarly, as shown in Fig. 1, the tube runs may alternatively be each defined by a straight piece of tubing. The design of the heat exchanger of Fig. 8, allows for greater surface area for a tube for heat dissipation.

Regarding claim 2, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have constructed the heat exchanger of Schild wherein the tube runs are defined by straight sections of a serpentine tube, in light of

Art Unit: 3726

the teachings of Tanaka, in order to the increase the effective heat dissipation area of the tube.

6. Claims 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schild in view of U.S. Pat. 4,860,822 to Sacks.

Schild discloses the invention cited above. However, the reference does not disclose that the fins are provided with curved sections between the slots.

Sacks discloses a method of forming a heat exchanger having a number of tube runs inserted within slots (16) in plate fin members (12). The plate fin members (12) have a sine-like wave pattern alternative in convex and concave portions between the slots (16). This configuration helps "increase the ability of late fin 12 to absorb or dissipate heat as required." Col. 3, lines 66-68.

Regarding claims 6 and 11, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided the fins of Schild with curved sections between the slots, in light of the teachings of Sacks, in order to increase the heat transfer efficiency of the heat exchanger.

Response to Arguments

7. Applicant's arguments filed March 31, 2005, have been fully considered but they are not persuasive.

Applicant contends that Nippon does not recite "a step of locating an assemblage of plate fins and tube runs on a supporting surface with the tube runs edges contacting

Art Unit: 3726

the supporting surface, and the fins above and out of contact with the supporting surface." Response, page 2. Applicant discloses this feature.

In assembling the heat exchanger illustrated in Fig. 1, the tubes 24 are inserted into aligned slots (not shown) in the headers 20, 22 and the stack of plate fins 26 applied thereto. Alternatively, the fins 26 may be applied to the tubes before application of the headers 20, 22. In any event, because of the relative dimensioning of the tubes 24 and the slots 34 as mentioned previously, the tube edges 40 will extend past the edges 36 of the fins 26. As a consequence of this, the core thus formed may be placed on a flat surface with the edges 40 of the tubes 24 in contact therewith for support. The same may be placed in a brazing oven (continuous or otherwise) and the temperature elevated to a brazing temperature. Because, in a typical construction, the fins 26 will be thinner than the walls of the tubes 24, as the fins 26 approach the melting temperature of the base metal and begin to soften, they will settle into the position illustrated in Fig. 3 through the action of gravity and without the need for any special fixturing to cause this result. Brazing will occur and upon cooling, the assembly will appear as in Fig. 3 with all of the fins 26 in the stack aligned with one another. The process not only avoids misalignment of the fins in the finished product which is unsightly, and thus undesirable, it eliminates the need for fixtures during the brazing process to hold the fins in place relative to the tubes, thereby considerably simplifying the manufacturing process.

Specification, pages 12-13. Upon review of NIPPON, the Examiner concludes that it cannot be ascertained whether or not the reference discloses locating the assemblage of plate fins and tube runs on a supporting surface with the tube runs edges contacting the supporting surface, and the fins above and out of contact with the supporting surface. Likewise, there is no disclosure as to the tubing extending past the edges of the plate fins. Therefore, the 102(b) rejections based on NIPPON are withdrawn. Note the reference is still relied on for its secondary teachings.

DE 852249 to Schild discloses a similar invention as disclosed by Applicant. The reference clearly states that the "lamellas do not extend beyond the outside extent of the pipes." See Altavista Machine Translation, fourth paragraph. In discussing the

Art Unit: 3726

drawbacks of the then prior art, Schild discloses problems with heat exchangers in which the “ribs or sheet metal lamellas exceed the very far over the tubing extent.” See Altavista Machine Translation, third paragraph. U.S. Pat. 1,913,175, cited by the DE 892249, is believed to be of the then prior art construction. As shown in Figure 1A of that reference the tubing does not extend past the slot of the plate fins. Furthermore, in U.S. ‘175 when the tubing and plate fins are inserted into the assembly fixture, the edges of the plates, rather than the tubing contact the support surface of the fixture. See e.g., Figure 14.

Schild disclose that his invention alleviates the problem with the then prior art construction, which the plate fins are “extremely thin and sensitive [to] mechanical damages.” See Altavista Machine Translation, fourth paragraph. Clearly, at the time of invention of Schild it was recognizes that the fins could be damaged by mechanical damages, by extending past the edge of tubing. The reference discloses “Pipes in lamellas also at two in relation to lying edges according to the mall pipe axle open *Recesses so pushed in and soldered are that the outside lamella edges do not tower above the outside round ranges of the flatoval crosswise cut.*” See Altavista Machine Translation, first paragraph (emphasis added). These teaching taken in context clearly teach and/or suggest locating the assemblage of plate fins and tube runs on a supporting surface with the tube runs edges contacting the supporting surface, and the fins above and out of contact with the supporting surface.

Furthermore, there is no disclosure by Schild that there is a need for any brazing fixture holding the fins and runs in assembled relations. In fact, Schild notes that the

Art Unit: 3726

construction of the heat exchanger is such that the plate fins are first pushed into place on the tubing runs and that spacing is insured by necks ("rag" in German), just like Applicant. See Altavista Machine Translation, fourth paragraph. Thus, the assembly is manufactured just like Applicant's invention. Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Compton whose telephone number is (571) 272-4527. The examiner can normally be reached on M-F, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter D. Vo can be reached on (571) 272-4690. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 3726

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Eric B. Compton
Primary Examiner
Art Unit 3726

ebc